CLAIM AMENDMENTS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method of determining placement of components in a rack comprising the steps of:

providing input variables comprising a rack height, an identification of a set of components, a weight and a height for each component in the set of components;

determining a placement of the components in the rack according to constraints by solving an optimization problem using a computer, the optimization problem using the rack height, the identification of the set of components, the height and weight for each component and the constraints; and

evaluating the placement of the components according to ~~an~~ at least one objective comprising at least a center of gravity objective.

2. (Previously Presented) The method of claim 1 wherein the constraints comprise:

a rack height constraint which requires that placement of a particular component does not result in a top height of the particular component exceeding the rack height;

a single placement constraint which requires that each component be placed once and only once; and

a non-overlapping constraint which requires that each slot in the rack be occupied by no more than a single component.

3. (Original) The method of claim 2 wherein the constraints further comprise a height preference constraint which prefers that a first component be placed above a second component.

4. (Previously Presented) The method of claim 1 wherein the step of determining placement of the components according to the constraints finds that at least one of the constraints cannot be met and further comprising the steps of:

relaxing a particular constraint; and

determining placement of the components according to remaining constraints.

5. (Original) The method of claim 4 wherein the step of relaxing the particular constraint comprises providing a choice of relaxation constraints to a user and the user selecting the particular constraint from the choice of relaxation constraints.

6. (Currently Amended) The method of claim 1 further comprising the step of providing ~~a weight and~~ a weight distribution for each component in the set of components.

7. (Currently Amended) The method of claim 1[[6]] wherein the step of evaluating the placement of the components in the rack according to the objective comprises seeking a minimum height for ~~the~~ a center of gravity.

8. (Currently Amended) The method of claim 1[[6]] wherein the step of evaluating the placement of the components in the rack according to the objective comprises ensuring that a height of the center of gravity does not exceed a selected height.

9. (Original) The method of claim 1 further comprising the step of providing a placement height range for a particular component, wherein the placement height range comprises a minimum height and a maximum height.

10. (Original) The method of claim 9 wherein the placement height range is increased, thereby forming an increase in the placement height range, and further wherein a penalty is applied to the objective according to the increase in the placement height range.

11. (Original) The method of claim 1 further comprising the step of providing an empty space requirement for a particular component.

12. (Original) The method of claim 11 wherein the empty space requirement is selected from the group consisting of an empty space requirement above the particular component and an empty space component below the particular component.

13. (Original) The method of claim 11 wherein the empty space requirement is relaxed, thereby forming a relaxation of the empty space requirement, and further wherein a penalty is applied to the objective according to the relaxation of the empty space requirement.

14. (Original) The method of claim 1 wherein the steps of determining and evaluating the placement of the components comprise the step of employing a mixed integer programming technique.

15. (Original) The method of claim 14 wherein the step of employing the mixed integer programming technique employs a heuristic approach.

16. (Original) The method of claim 1 further comprising a contiguous placement constraint for at least two of the components within the set of components.

17. (Original) The method of claim 16 wherein the step of determining the placement of the components in the rack according to the constraints comprises forming a virtual component from the at least two components according to the contiguous placement constraint and further wherein remaining constraints determine placement of the virtual component.

18. (Original) The method of claim 1 further comprising the step of evaluating the placement of the components according to a second objective.

19. (Original) The method of claim 1 further comprising the step of evaluating the placement of the components according to additional objectives.

20. (Original) The method of claim 1 wherein the constraints comprise hard constraints.

21. (Original) The method of claim 1 wherein the objective comprises a soft constraint.

22. (Original) The method of claim 1 wherein the objective comprises a sum of soft constraints.

23. (Previously Presented) A method of determining placement of components in a rack comprising the steps of:

providing a rack height, an identification of a set of components, and, for each component in the set of components, a height, a weight, and a weight distribution;

determining a placement of the components in the rack according to constraints by solving an optimization problem using a computer, the optimization problem using the rack height, the identification of the set of components, the height, weight and weight distribution for each component and the constraints, wherein the constraints comprise:

a rack height constraint which requires that placement of a particular component does not result in a top height of the particular component exceeding the rack height;

a single placement constraint which requires that each component be placed once and only once; and

a non-overlapping constraint which requires that each slot in the rack be occupied by no more than a single component; and

evaluating the placement of the components by seeking a minimum height for a center of gravity of the components.

24. (Currently Amended) A computer readable memory comprising computer code for directing a computer to make a determination of placement of components in a rack, the determination of the placement of the components comprising the steps of:

~~providing~~obtaining input variables comprising a rack height, an identification of a set of components, a weight and a height for each component in the set of components;

determining a placement of the components in the rack according to constraints by solving an optimization problem using the rack height, the identification of the set of components, the height and weight for each component and the constraints; and

evaluating the placement of the components according to ~~an~~ at least one objective comprising at least a center of gravity objective.

25. (Previously Presented) The computer readable memory of claim 24 wherein the constraints comprise:

a rack height constraint which requires that placement of a particular component does not result in a top height of the particular component exceeding the rack height;

a single placement constraint which requires that each component be placed once and only once; and

a non-overlapping constraint which requires that each slot in the rack be occupied by no more than a single component.

26. (Previously Presented) The computer readable memory of claim 24 wherein the step of determining placement of the components according to the constraints finds that at least one of the constraints cannot be met and further comprising the steps of:

relaxing a particular constraint; and

determining placement of the components according to remaining constraints.

27. (Original) The computer readable memory of claim 26 wherein the step of relaxing the particular constraint comprises providing a choice of relaxation constraints to a user and the user selecting the particular constraint from the choice of relaxation constraints.

28. (Currently Amended) The computer readable memory of claim 24 further comprising the step of obtaining ~~a weight and~~ a weight distribution for each component in the set of components.

29. (Currently Amended) The computer readable memory of claim 24[[28]] wherein the step of evaluating the placement of the components in the rack according to the objective comprises seeking a minimum height for ~~the~~ a center of gravity.

30. (Currently Amended) The computer readable memory of claim 24[[28]] wherein the step of evaluating the placement of the components in the rack according to the objective comprises ensuring that a height of the center of gravity does not exceed a selected height.

31. (Original) The computer readable memory of claim 24 wherein the step of evaluating the placement of the components comprises the step of employing a mixed integer programming technique.

32. (Original) The computer readable memory of claim 31 wherein the step of employing the mixed integer programming technique employs a heuristic approach.

33. (Currently Amended) A computer readable memory comprising computer code for directing a computer to make a determination of placement of components in a rack, the determination of the placement of the components comprising the steps of:

obtaining a rack height, an identification of a set of components, and, for each component in the set of components, a height, a weight, and a weight distribution;

determining a placement of the components in the rack according to constraints by solving an optimization problem using the rack height, the identification of the set of components, the height, weight and weight distribution for each component and the constraints, wherein the constraints comprise:

a rack height constraint which requires that placement of a particular component does not result in a top height of the particular component exceeding the rack height;

a single placement constraint which requires that each component be placed once and only once; and

a non-overlapping constraint which requires that each slot in the rack be occupied by no more than a single component; and

evaluating the placement of the components by seeking a minimum height for a center of gravity of the components.